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Research Article

A revalidation and redescription of the orb-web spider *Araniella tbilisiensis* (Mcheidze 1997) (Araneae: Araneidae)

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Abstract

Based on the female lectotype from the D.E. Kharitonov's collection, we provide a re-evaluation and redescription of an orb-web spider *Araniella tbilisiensis* (Mcheidze, 1997). Following an examination of *Araniella villanii* Zamani et al., 2020 paratypes, we considered this a junior synonym of *A. tbilisiensis*. Additionally, the photographs of the epigyne of a female specimen from D.E. Kharitonov's collection, originally assigned to *A. tbilisiensis*, are presented as an unknown *Araniella* sp.

Key words: Araneomorphae, Georgia, orb-web spiders, South Caucasus, synonymy

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Introduction

Araniella Chamberlin & Ivie, 1942 comprises 18 species in the world fauna (WSC 2025), with some of the congeners being similar morphologically, especially in females (Spasojevic et al. 2016). The orb-weaver *Araniella tbilisiensis* (Mcheidze 1997) (originally *Araneus tbilisiensis*), was described in her monograph by Georgian arachnologist Tamara Mcheidze. The original description was reported in Georgian and was based on four females and a single male collected in 1921 in Tbilisi. It included figures of the habitus of both sexes and a drawing of an epigyne. The species was subsequently transferred to the genus *Araniella* Chamberlin & Ivie, 1942 by Mikhailov (1998) on the basis of these drawings. For a long time, the reevaluation of this species has been complicated due to the poor quality drawings and the language of the original publication, spoken by only a few researchers, until Stefan Otto provided an English translation of the monograph (Mcheidze 2014). Further, *A. tbilisiensis* was considered as a synonym of *A. opisthographa* (Kulczyński, 1905), on the basis of similar morphology and overlapping distribution (Zamani et al. 2020) but without any re-examination of the type material.

The type material had been considered lost or damaged (S. Otto, personal communication), until we discovered samples of two female epigynes, a batch of slides containing female legs and body fragments, and a male palp, in a collection of microslides deposited at the Perm State University. These samples were identified by D.E. Kharitonov (T. Mcheidze's mentor) as *A. tbilisiensis*. The labels on the microslides of one series (female: epigyne, body parts) clearly

indicate their belonging to the type series. The epigyne of a specimen from Uzbekistan, identified by D.E. Kharitonov as *A. tbilisiensis*, differs from all known species of *Araniella*.

In this paper we aim to resolve the taxonomical issues associated with synonymy of *A. tbilisiensis*. Images of specimens and label data, measurements and commentaries on the morphology of genitalia, a diagnosis, and a distribution map of *A. tbilisiensis* and *Araniella* sp. are provided.

Material and methods

The type material is stored in D.E. Kharitonov's collection of permanent slides of spiders at the Perm State University (PSUpr; curator S.L. Esyunin); the numeration is provided according to Esyunin (2017). The images of genitalia were taken using a Zeiss Imager.A2 microscope with a Panasonic GH5 digital camera. Stacks of images were processed using CombineZM software. The material of *A. villanii* was borrowed from the Zoological Museum of Moscow State University, Moscow, Russia (ZMMU; curator: K.G. Mikhailov). Leg measurements are given as follows: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are given in millimetres. The genital morphology follows that by Levi (1974) and Zamani et al. (2020).

Abbreviations

AER: anterior eyes row;
ALE: anterior lateral eye;
AME: anterior median eye;
MOQ: median ocular quadrangle;
MOQ-AW: MOQ anterior width;
MOQ-L: MOQ length;
MOQ-PW: MOQ posterior width;
PER: posterior eyes row;
PLE: posterior lateral eye;
PME: posterior median eye.

Results

Family Araneidae Clerck, 1757

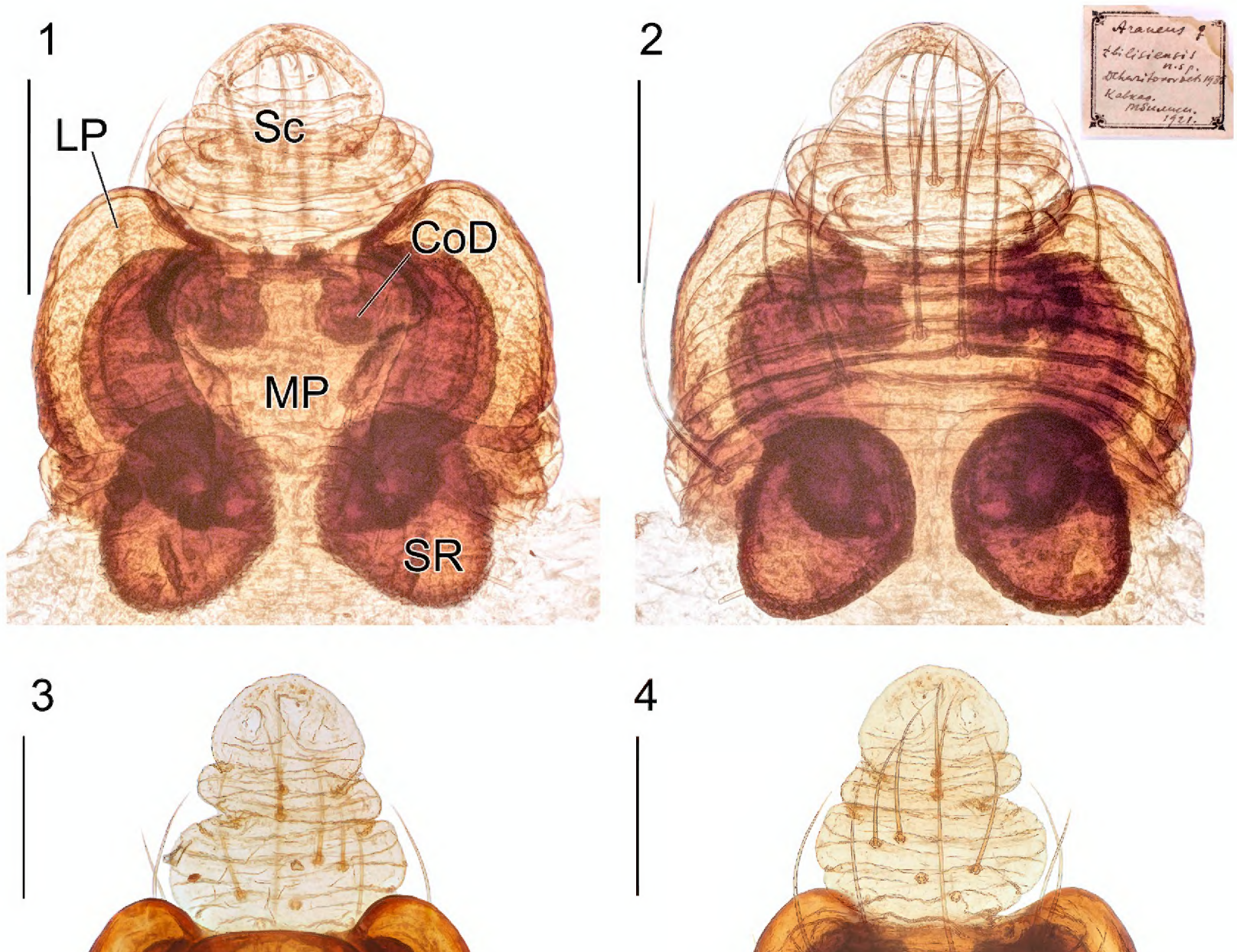
Genus *Araniella* Chamberlin & Ivie, 1942

Araniella tbilisiensis (Mcheidze, 1997)

Figs 1–6

Araneus tbilisiensis Mcheidze 1997: 280, figs 642–644 (♂♀)
Araniella tbilisiensis: Mikhailov 1998: 18 (transferred from Araneus).
Araniella villanii Zamani et al. 2020: 23, figs 1B, 1D, 3A–B, 4C-D, 5A-B, 7A, 8A, 9A, 10A, 18 (♂♀) New Synonym.

Material examined. Types. Lectotype ♀ (epigyne: PSUpr-24-01, leg II: PSUpr-74-14, right leg I: PSUpr-74-01, left leg I: PSUpr-74-07, right leg II: PSUpr-74-11, left leg II: PSUpr-74-02, right leg III: PSUpr-74-03, left leg III: PSUpr-74-05, right leg IV: PSUpr-74-10, sternum: PSUpr-74-08, chelicerae: PSUpr-74-13, pedipalps: PSUpr-74-06, abdomen (ventral side): PSUpr-74-12, abdomen (dorsal side): PSUpr-74-04, cephalothorax: PSUpr-74-09), Georgia: Tbilisi, 41°42.00'N, 44°48.00'E, 1921 (collector unknown).



Figures 1-6. Copulatory organs of *Araniella tbilisiensis* (Mcheidze, 1997). **1–2**: Epigyne (lectotype); **3–4**: (paratype *Araniella villanii* (ZMMU Ta-8234), Tarbagatai Mt. Range); **5–6**: male palp; **1, 3**: posterior view; **2, 4**: anterior view; **5**: retrolateral view; **6**: lateral view. Abbreviations. Epigyne: **LP**: lateral plate; **Sc**: scapus; **MP**: median plate; **CoD**: copulatory duct; **SR**: seminal receptacle. Palp: **MA**: median apophysis; **Em**: embolus; **CD**: conductor; **TA**: terminal apophysis; **Tt**: tip of tegulum; **Tr**: tegular ridge. Scale bars = 0.2 mm.

Paratypes of *Araniella villanii* Zamani et al., 2020. Kazakhstan. • 2♂4♀ (ZMMU Ta-8234), East Kazakhstan Region: Urzhar Distr., Tarbagatai Mt. Range, 5 km NE of Alekseevka, Urzharka river canyon, left bank; 47°17.00'N, 81°37.00'E; 1050–1200 m; 23 June 2001; leg. Gromov A.V. ; • 3♂4♀ (ZMMU Ta-8233), Urzhar Distr., 7–8 km NE of Karatuma [=Kirovka], Tarbagatai Mt. Range, Sholakterek river canyon, left bank; 47°10.00'N, 82°06.00'E; 1200–1250 m; 23 June 2001; leg. Gromov A.V.; • ♂2♀ (ZMMU Ta-8232), Urzhar Distr., ca. 4 km NE of Kyzylbulak [=Petrovskoye], Kyzylbulak river canyon, left bank; 47°03.00'N, 82°18.00'E; 1100–1150 m; 21 June 2001; leg. Gromov A.V.

Other material examined. • ♂ (palp: PSUpr-24-06); between Sughd Region, Khujand, Tajikistan; 40°17.00'N, 69°37.00'E and Tashkent Region, Humson, 41°41.00'N, 69°56.00'E Uzbekistan (collector unknown); • ♂ (PSU) East Kazakhstan Region: Alekseevka vill.; 50°27.00'N, 81°28.00'E; 23 June 1996; leg. Zinchenko V.K.

Remarks. The female from Georgia (Figs 1–2) is designated as the lectotype, because its label data corresponds to the original description and directly states it belongs to the type series. A male specimen from the type series is unavailable. We compared the type specimen of *A. tbilisiensis* with the collection materials of *A. opisthographa*, and concluded that the tentative synonymisation of *A. tbilisiensis* was incorrect, and that *A. tbilisiensis* is a valid species.

Comparing the lectotype with congenerics, we found that the genital structure of the female of Araniella villanii Zamani et al., 2020 shows no differences with *A. tbilisiensis*. Upon examining the *A. villanii* paratypes stored at ZMMU (Figs 3–4), we concluded that revised specimens are conspecific.

The male specimen, identified by D.E. Kharitonov as *A. tbilisiensis* also matches with the description of *A. villanii*. This specimen does not belong to the type series due to different years and collection locations, but the genitalia structure is similar to that of *A. villanii*, and collection area corresponds to the *A. villanii* distribution area.

The species was illustrated and described to a high standard by Zamani et al. 2020; consequently, for a description of morphology refer to Zamani et al. 2020 sub *A. villanii*. We made additional photographs of the *A. villanii* paratype epigyne to better visualise the copulatory ducts and seminal receptacles. The shape and arrangement of these structures show no differences from the lectotype of *A. tbilisiensis*. Therefore, we consider *A. villanii* to be a junior synonym of *A. tbilisiensis*.

Female lectotype. Carapace 2.55 long, 2.15 wide. Sternum 1.20 long, 1.05 wide. Chelicera length 1.30. Eye diameters and interdistances: AME 0.09, ALE 0.07, PLE 0.06, PME 0.11; AME-AME 0.16, AME-ALE 0.33, PLE-PME 0.34, PME-PME 0.07, MOQ-AW 0.3, MOQ-PW 0.3, MOQ-L 0.21. Measurements of legs I: 7.65 (2.35, 1.05, 1.75, 1.7, 0.8), II: 6.95 (2.05, 1.00, 1.55, 1.6, 0.75), III: 4.80 (1.6, 0.65, 0.95, 0.95, 0.65), IV: 6.85 (2.15, 0.85, 1.5, 1.6, 0.75). Abdomen 4.70 long, 3.50 wide. Epigyne (Figs 1–4). Male palp (Figs 5–6).

Diagnosis. In the original description, Mcheidze compares *A. tbilisiensis* with *Araneus croaticus* Kulczynski, 1905 (= *Araniella displicata* (Hentz, 1847)), noting that species differ in the following: 1) median plate of epigyne is broader and overall shorter in *A. tbilisiensis* than in *A. displicata*; 2) there is a dark lateral fringe on scapus of *A. tbilisiensis*. Additionally, in *A. tbilisiensis* copulatory ducts are directed towards each other, their width is only half width of semi-

nal receptacles, whereas in *A. displicata*, copulatory ducts are directed in opposite directions and are more than twice as narrow as seminal receptacles. The scape of *A. tbilisiensis* is narrower than the base of epigyne, whereas in *A. displicata* the scape is wider than the base of the epigyne. The species also resembles *A. proxima* (Kulczyński, 1885) and *A. opisthographa* (Kulczyński, 1905). The differences between these species are described in detail in Zamani et al. 2020 sub *A. villanii*.

Distribution. Georgia, Tajikistan OR Uzbekistan [present paper], Iran, Kazakhstan, India (Zamani et al. 2020), Azerbaijan (Zamani et al. 2025) (Fig. 7).

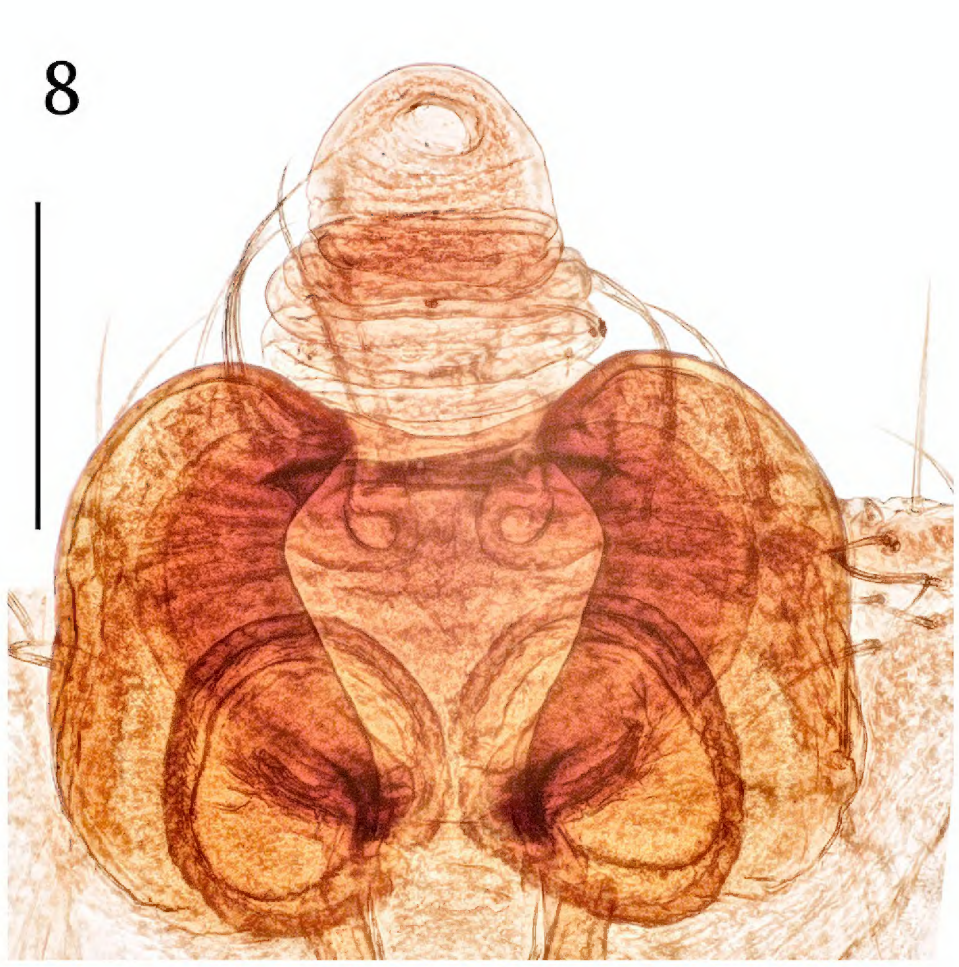
***Araniella* sp.**

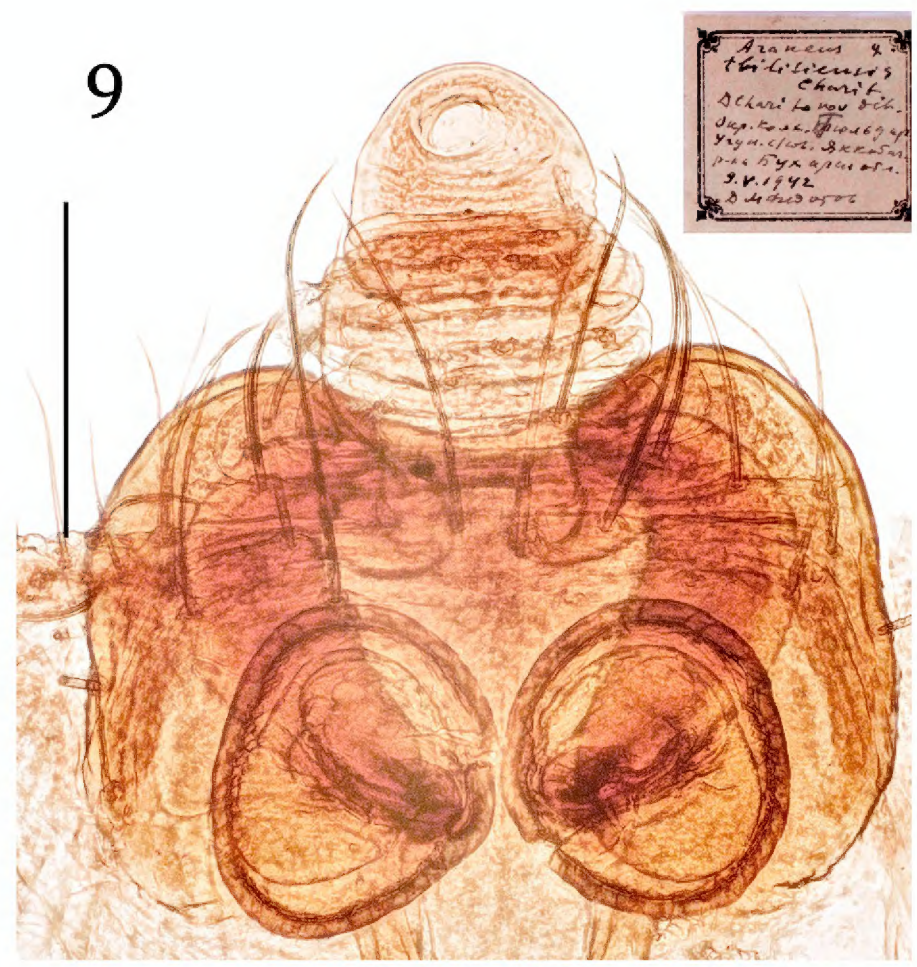
Figs 8–9

Material examined. D.E. Kharitonov's collection. ♀ (epigyne: PSUpr-24-08), Uzbekistan: Qashqadaryo Region, Yakkabog' District, Guldara, 38°46.00'N, 66°49.00'E, 09.05.1942 (D.M. Fedotov).

Diagnosis. The female *Araniella* sp. was found in D.E. Kharitonov's collection (identified as *A. tbilisiensis*). However, it differs from *A. tbilisiensis* in the following aspects: seminal receptacles located close to each other, more rounded lateral plates, narrower scapus with width equal the width of median plates, and dome-shaped tip of scapus.

Figure 7. Collecting sites of: *Araniella tbilisiensis* (Mcheidze, 1997) – circles, *Araniella* sp. – square. Colours: green – present data, blue – Zamani et al. (2020), purple – Zamani (et al. 2025). The lectotype collection site is marked with a cross sign. The collection site of the male from D.E. Kharitonov's collection is marked with a hatched area.





Figures 8–9. Epigyne of *Araniella* sp. from Uzbekistan. **8**: posterior view; **9**: anterior view. Scale bars = 0.2 mm.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

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Data availability

All of the data that support the findings of this study are available in the main text or Supplementary Information.

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